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10/815,526	03/31/2004	Marie-Pierre Bacos	52186/DBP/N75	3474
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CHRISTIE, PARKER & HALE, LLP			EXAMINER	
PO BOX 7068			LAFOND, RONALD D	
PASADENA, CA 91109-7068			ART UNIT	PAPER NUMBER
			1792	
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			12/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/815,526

Applicant(s)

BACOS ET AL.

Examiner

Ronald D. Lafond

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

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DETAILED ACTION

Response to Amendment

1. The Amendments of October 4, 2007, were received and have been entered. Claims 1, 9, 20, 22, and 23 are acknowledged as amended. Claims 24 and 25 are acknowledged as new. This Action is in response to amended Claims 1 – 25, which are currently pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 – 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Regarding Claims 1 and 24, both of these Claims recite the limitation "at a high temperature", which is a relative term which renders the claim indefinite. The term "high temperature" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For purposes of compact prosecution, the Examiner will interpret this term to be inclusive of 950 C and higher.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1 – 4, 6 – 21, 23, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Darolia (United States Patent 6,273,678 B1).

7. Regarding Claims 1 and 24, Darolia teaches a method/process for forming a protective coating containing aluminium on a surface of a metal substrate (see Column 7, lines 1 – 5, and Column 3, lines 51 and 52), the method comprising: placing the metal substrate and a non-gaseous precursor containing aluminium in contact, at a high temperature, with an atmosphere containing an active gas (see generally

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Column 7, lines 1 – 54, and Figure 4); reacting the atmosphere containing the active gas with the non-gaseous precursor containing aluminium to form a gaseous aluminium compound (see Column 7, lines 33 – 36); decomposing the gaseous aluminum compound on contact with the metal substrate and depositing aluminium metal on the metal substrate, wherein the atmosphere further comprises a gaseous compound of a modifier metal (see Column 7, lines 36 – 45); and decomposing the gaseous compound of the modifier metal on contact with the metal substrate and simultaneously depositing the modifier metal on the metal substrate with the depositing of the aluminium metal (see again Column 7, lines 33 – 45).

8. Regarding Claim 2, Darolia teaches the process in which the said modifier method is selected from zirconium, hafnium, and yttrium (see Column 7, lines 12 – 24).

9. Regarding Claims 3 and 4, Darolia teaches the process in which the said active gas at least in part comprises the said gaseous compound (see Column 7, lines 33 – 36).

10. Regarding Claim 6, Darolia teaches the process according to Claim 3, in which the said active gas also contains at least one ammonium compound (see Column 7, lines 9 – 10, "... and a halide activator, preferably ... ammonium fluoride").

11. Regarding Claim 7, Darolia teaches the process in which the said active gas and/or the said gaseous compound are formed by the vaporization of at least one substance which is solid at ambient temperature mixed with the said precursor (see Column 7, lines 7 – 36). Darolia teaches that the precursor of the modifying element is preferably zirconium chloride. Because $ZrCl_4$ is a solid at ambient temperatures as disclosed by Applicants, all of the limitations of the claim are taught by Darolia.

12. Regarding Claim 8, Darolia teaches the process in which the substrate contains at least one element which combines with the aluminium to form an intermetallic compound within the coating in which the aluminium is partly substituted by the modifier metal (see Column 4, lines 23 – 41, and specifically "The remainder of the diffusion aluminide internal protective layer, which is not aluminum and not the modifying element, is elements that are interdiffused into the diffusion aluminide internal protective layer from the substrate, primarily nickel," at lines 32 – 36.)

13. Regarding Claim 9, Darolia teaches the process according to Claim 8, in which the element of the substrate is nickel (see Column 3, lines 28 – 30) and the intermetallic compound is β -NiAl. Applicants

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disclose that "the coating obtained essentially comprises the β -NiAl phase, which has a simple cubic structure. This phase has a wide range of non-stoichiometry from NiAl⁽⁺⁾ (57% by atoms) to NiAl⁽⁻⁾ (37% by atoms)." Darolia teaches, in Column 4, lines 23 – 25, that "... the average aluminum content of the diffusion aluminide ... layer is from about 16 to about 30 percent by weight." Because about 16 to about 30 percent by weight Aluminium corresponds to about 29 to about 48 percent by moles or by atoms in an essentially binary Nickel-Aluminium mixture, and because the process taught by Darolia is essentially the same as the process disclosed by Applicants, much of the nickel aluminide layers formed in the process taught by Darolia, from 37% to 48% Aluminium by atoms, would necessarily be β -NiAl as defined by Applicants, and thus all the limitations of the claim are met.

14. Regarding Claim 10, Darolia teaches the process in which the substrate is a nickel-based superalloy (see Column 3, lines 28 – 30).

15. Regarding Claim 11, Darolia teaches the process in which the said active gas and/or the said gaseous compound contain at least one halogen (see Column 7, lines 19 – 21, and lines 33 – 36).

16. Regarding Claim 12, Darolia teaches the process according to Claim 10, in which the said gaseous compound is zirconium chloride (see Column 7, lines 19 – 21, and lines 33 – 36).

17. Regarding Claims 13 and 14, Darolia teaches the processes according to Claims 11 and 12, in which the said active gas contains ammonium fluoride (see Column 7, lines 9 – 10).

18. Regarding Claim 15, Darolia teaches the process in which the said precursor is an alloy of aluminium and chromium (see Column 7, lines 6 – 8, and lines 15 – 17).

19. Regarding Claims 16 and 17, Darolia teaches the process in which the substrate and the precursor are at a distance from each other, and in which the substrate is located above the precursor (see Column 6, lines 41 – 58, and Figure 4).

20. Regarding Claim 18, Darolia teaches the process in which the substrate and the precursor are in contact (Darolia teaches, in Column 7, lines 55 – 60, that "other operable approaches for introducing the source of aluminum into the internal passages may also be used. Examples include ... pack cementation, and above-the-pack aluminiding." Pack cementation is a term well-known in the art of aluminide coatings

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that refers to a process in which the substrate and a non-gaseous precursor containing aluminum are placed in contact and then heated).

21. Regarding Claim 19, Darolia teaches the process in which the substrate and the precursor are located in an enclosure permitting only limited exchange with the exterior (see Column 7, lines 6 – 12, and Column 6, lines 41 – 58).

22. Regarding Claim 20, Darolia teaches the process according to Claim 1, in which in addition to the active gas and the gaseous compound the said atmosphere comprises an inert or reducing gas and preferably hydrogen (see Column 7, lines 36 – 40).

23. Regarding Claim 21, Darolia teaches the process in which the modifier element is present in the said protective coating in a concentration by mass of less than 0.5% (see Column 3, lines 64 – 67 and Column 4, line 1, where it states that "The modifying element is hafnium, yttrium, zirconium ... The modifying element is present ... in an amount of from about 0.1 to about 5.0 weight percent of the diffusion aluminide internal protective layer.")

24. Regarding Claim 23, Darolia teaches the process in which the said high temperature lies between about 980 C and about 1150 C (see Column 7, lines 46 – 47, "The retort is usually heated to a deposition reaction temperature of from about 1800 F to about 2100 F," corresponding to a range of about 980 to about 1150 C. Because Applicants' claimed high temperature of 1080 C lies within the range taught by Darolia, it is anticipated).

Claim Rejections - 35 USC §102/103

25. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

26. Claims 5 and 25 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Darolia.

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27. Regarding these Claims, Darolia teaches the process/method in which the said active gas solely comprises or consists of the gaseous compound of the modifier metal (zirconium chloride; see Column 7, lines 12 – 22).

28. In the alternative, Darolia does not explicitly teach the process/method in which the said active gas solely comprises or consists of the gaseous compound of the modifier metal. However, as discussed, Darolia teaches, in Column 7, lines 33 – 36, that "... the halide gas containing the modifying elements contact[s] the aluminum-containing material and the source of the modifying element to form the corresponding halide gas." That is, Darolia is implicitly teaching that the halide gas containing the modifying elements can react with the aluminium-containing precursor in an equilibrium reaction to form an aluminium halide gas. Moreover, Darolia teaches that the "preferred source of zirconium is ... zirconium chloride," which is a halide that contains the modifying element and is a gas at the temperatures at which the claimed process operates, as disclosed by Applicants, and that other metal halides are capable of being halide activators (Column 7, lines 9 – 10). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the method taught by Darolia by using an active gas comprising a single gaseous compound that is both an activator halide and a source of the modifying element in the process disclosed by Darolia with a reasonable expectation of success, because Darolia teaches both that a halide active gas containing the modifying metal element reacts with the aluminium-containing precursor and that the source of the modifying element is preferably a halide compound of the modifying metal (e.g., hafnium or zirconium chloride).

Claim Rejections - 35 USC § 103

29. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Darolia.

30. Regarding this Claim, Darolia does not explicitly teach the process according to Claim 21 in which the said concentration by mass lies at or above 500 ppm and below 1000 ppm. However, as discussed for Claim 21, Darolia does teach, in Column 3, lines 65 – 67, and Column 4, line 1, that "the modifying element is present, on average, in an amount of from about 0.1 to about 5.0 weight percent of the diffusion aluminide internal protective layer." It has been held that, in the case where the claimed ranges

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"overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Circ. 1990). See MPEP 2144.05 I. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the method taught by Darolia by forming a protective coating in which the modifier metal is present in a concentration by mass of less than 0.1% or 1000 ppm, because Darolia teaches the process for forming protective coatings in which the modifier metal is present in amounts of about 1000 ppm and because it has been held that in the case where the claimed range overlaps a range disclosed by the prior art a *prima facie* case of obviousness exists.

Response to Arguments

31. Applicant's arguments with respect to the rejections of Claims 1 – 15 and 18 – 23 under 35 U.S.C. 103(a) over Darolia in view of Wachtell and with respect to the rejections of Claims 16 and 17 under 35 U.S.C. 103(a) over Darolia in view of Fournes have been considered but are moot in view of the new ground(s) of rejection.

32. In light of Applicants' amendment to and elaboration of the proper construction of Claim 1, the Objections to Claims 16 and 18 have been withdrawn.

33. In light of Applicants' amendment to Claim 9, the rejection of this Claim under 35 U.S.C. 112, Second Paragraph, has been withdrawn. In light of Applicants' amendment to and elaboration of the proper construction of Claim 1, the rejections Claims 16 and 17 under 35 U.S.C. 112, Second Paragraph, have been withdrawn.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald D. Lafond whose telephone number is (571) 270-1878. The examiner can normally be reached on M - F, 9:30 AM - 6 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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